

MAY. 15. 2008 5:44PM OBLON SPIVAK

Serial No.: 10/521,433

NO. 261 P. 2

Docket No.: 264595USOPCT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF:

KAZUYA GOTO ET AL.

GROUP: 1771

SERIAL NO: 10/521,433

EXAMINER: PIZIALI, A.

FILED: JANUARY 14, 2005

FOR: PREPREG, INTERMEDIATE
MATERIAL FOR FORMING
FRP, AND METHOD FOR
PRODUCTION THEREOF AND
METHOD FOR PRODUCTION
OF FIBER-REINFORCED
COMPOSITE MATERIAL

DECLARATION UNDER 37 C.F.R. § 1.132

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

Sir:

Now comes Kazuki Koga who deposes and states that:

1. I am a graduate of Kyushu University and received my master degree in the year 1999.
2. I have been employed by Mitsubishi Rayon Co., Ltd. for 8 years as a Researcher in the field of Carbon Fiber Reinforced Plastics.
3. I have provided the previously filed Rule 132 Declaration signed November 6, 2007.

The data of the Rule 132 Declaration filed November 13, 2007, show that using a microcapsule in the curing agent can delay the time in which the viscosity of the resin composition begins to increase and can lower the minimum viscosity required for the resin to reach the non-impregnated portion.

Further, there is a disclosure regarding the viscosity at page 20, line 15 to page 21, line 3 and at page 22, line 20 to page 23, line 2, of the specification:

On the other hand, prepregs must typically display favorable handling characteristics at room temperature. Two major factors in determining the handling characteristics are the tack (the degree of stickiness) and the drape

MAY. 15. 2008 5:44PM OBLON SPIVAK
Serial No.: 10/521,433

NO. 261 P. 3

characteristics (the flexibility), and in order to optimize the tack and drape characteristics, the thermosetting resin composition that functions as the matrix resin must have a viscosity that falls within a certain range. If the viscosity of the thermosetting resin composition is too low, then the tackiness is too powerful, making handling extremely difficult, whereas if the viscosity is too high, then the tackiness is overly weak, and the drape characteristics can effectively disappear, which also makes handling very difficult. Hence, in order to ensure favorable handling characteristics for the prepreg, the thermosetting resin composition must have a viscosity that falls within an appropriate range. Accordingly, if a thermosetting resin composition cures at lower temperatures, then this means that the composition is capable of curing while still at a relatively higher viscosity, and is consequently suitable as a thermosetting resin composition for a prepreg of the second embodiment, which is capable of yielding a favorable molded product even with comparatively poor fluidity.

....
When the matrix resin is supplied to the sheet-like reinforcing fiber substrate, it is preferably stuck to the substrate at room temperature, without heating. However, in those cases where the viscosity of the matrix resin at room temperature is very high, the resin may be heated slightly to improve the level of fluidity. However even in such cases, in order to ensure that a continuous resin non-impregnated portion such as that described below is left inside the substrate, any heating is preferably conducted at no more than 40°C, and even more preferably at no more than 30°C.

Notably, there is nothing in the cited references (Xu (US 6,391,436) in view of Chernack (US 4,808,659) or Sawapka (US 5,589,523), Hattori (US 5,279,893), Kishi (US 6,045,898)) that would suggest that a lower minimum viscosity is achieved using the microcapsules as in the present invention. This is not expected from the references.

In addition, looking at the two graphs in the Figure of the Rule 132 Declaration filed November 13, 2007, there is no expectation from the cited references that the viscosity difference between the two samples (the gap between the graphs) changes depending on the temperature. In particular, there is no expectation based on the cited references that the viscosity difference between the two samples increases dramatically starting at about 70°C.

Further, there is nothing in the prior art references or catalogues of the microcapsules (attached herewith and incorporated by reference) that would suggest that a low viscosity can be kept for a longer period of time by using the microcapsules. In addition, the effect of the microcapsules, which allow the materials to maintain a low viscosity for a longer period of

MAY. 15. 2008 5:45PM OBLON SPIVAK

NO. 261 P. 4

Serial No.: 10/521,433

time was found surprisingly when the microcapsules were used for enhancing the storage stability at a low temperature.

Enclosed is a catalogue of the microcapsule (NOVACURE HX-3722) used in the experiment of the Rule 132 Declaration dated November 13, 2007.

The Rule 132 Declaration filed November 13, 2007, shows the changes of the viscosity of the resin composition relative to an increase of temperature during the curing. Xu, Chemack, Sawanaka, Hattori, Kishi, alone or in combination do not disclose or suggest the superior results obtained when using a prepreg as claimed in which the matrix comprises a microcapsule based latent curing agent as claimed. Such results are not expected based on the references.

As shown in the Figures of the Declaration, using a microcapsule in the curing agent can delay the time in which the viscosity of the resin composition begins to increase and can lower the minimum viscosity required for the resin to reach the non-impregnated portion. Assuming that a viscosity of less than η is appropriate for the impregnation of the resin, the time to keep the viscosity less than η is longer when using the microcapsule based latent curing agent. As a result, the matrix resin of the present invention can keep a lower viscosity for a long time until the resin is cured, and a molded product without voids can be obtained even if the fiber substrate has a heavy weight (g/m^2).

For further understanding of the invention see for example Figure 3 of the specification which illustrates an embodiment of the present invention and compare to Figure 5 of the specification. In Figure 3, the matrix resin non-impregnated layer 32 is formed as a continuous layer, while in Figure 5 there is a non-continuous non-impregnated layer. See also the discussion of these figures at page 16, starting at line 4 of the specification.

Further, the specification states at page 15, lines 11-18 as follows:

In a prepreg according to the second embodiment, the portion inside the sheet-like reinforcing fiber substrate into which the matrix resin has not been impregnated must be a continuous portion. In the second embodiment, this non-impregnated portion functions as the deaerating circuit, and the existence of this deaerating circuit means that the molded FRP can be formed without internal voids and surface pinholes.

MAY. 15. 2008 5:45PM OBLON SPIVAK
Serial No.: 10/521,433

NO. 261 P. 5

However, if this deaerating circuit is segmented by the matrix resin, then the air that is enclosed by the matrix resin becomes extremely difficult to remove, and can give rise to internal voids and surface pinholes.

Chernack or Sawaoka, Hamori, Kishi do not cure the defects of Xu.

Therefore, the rejections of the claims over Xu (US 6,391,436) in view of Chernack (US 4,808,659) or Sawaoka (US 5,589,523), Hamori (US 5,279,893), Kishi (US 6,043,898) are believed to be unsustainable as the present invention is neither anticipated nor obvious and withdrawal of these rejections is respectfully requested.

4. The undersigned petitioner declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

5. Further deponent saith not.

Customer Number

22850

Tel. (703) 413-1000
Fax. (703) 413-2220
(OSM/MON 05/06)

Signature

Kazuki Koga

Date

May 21 2008